

# 512K x 16 HIGH-SPEED ASYNCHRONOUS CMOS STATIC RAM WITH 3.3V SUPPLY

OCTOBER 2009

## FEATURES

- High-speed access times:  
8, 10, 20 ns
- High-performance, low-power CMOS process
- Multiple center power and ground pins for greater noise immunity
- Easy memory expansion with  $\overline{CE}$  and  $\overline{OE}$  options
- $\overline{CE}$  power-down
- Fully static operation: no clock or refresh required
- TTL compatible inputs and outputs
- Single power supply  
 $V_{DD}$  1.65V to 2.2V (IS61WV51216ALL)  
 speed = 20ns for  $V_{DD}$  1.65V to 2.2V  
 $V_{DD}$  2.4V to 3.6V (IS61/64WV51216BLL)  
 speed = 10ns for  $V_{DD}$  2.4V to 3.6V  
 speed = 8ns for  $V_{DD}$  3.3V  $\pm$  5%
- Packages available:
  - 48-ball miniBGA (9mm x 11mm)
  - 44-pin TSOP (Type II)
- Industrial and Automotive Temperature Support
- Lead-free available
- Data control for upper and lower bytes

## DESCRIPTION

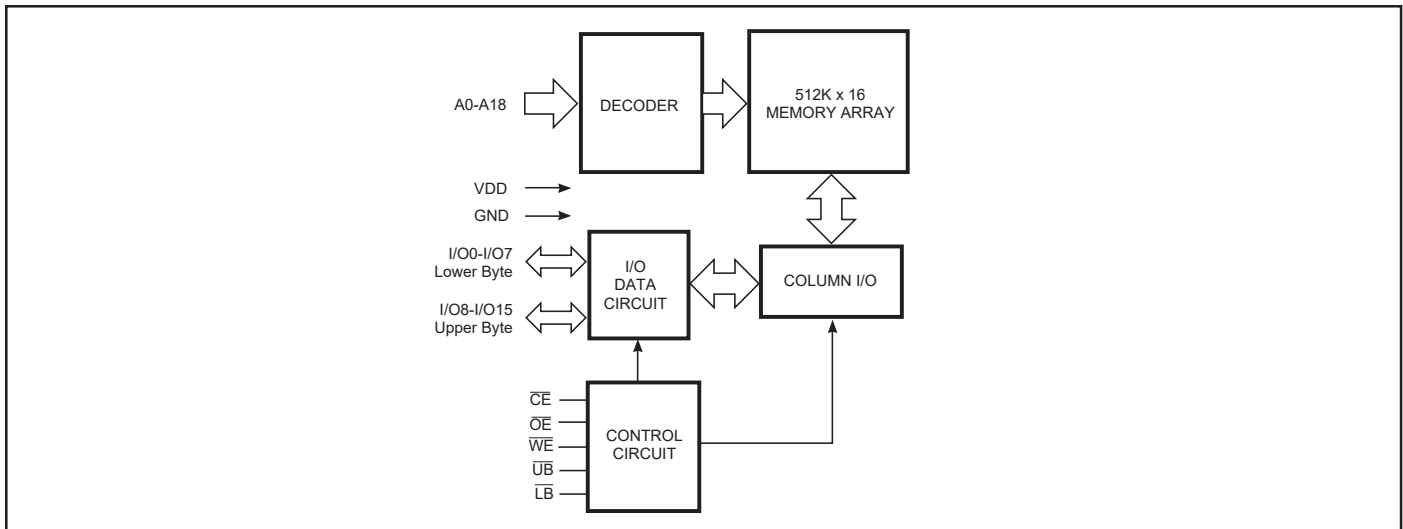
The *ISSI* IS61WV51216ALL/BLL and IS64WV51216BLL are high-speed, 8M-bit static RAMs organized as 512K words by 16 bits. It is fabricated using *ISSI*'s high-performance CMOS technology. This highly reliable process coupled with innovative circuit design techniques, yields high-performance and low power consumption devices.

When  $\overline{CE}$  is HIGH (deselected), the device assumes a standby mode at which the power dissipation can be reduced down with CMOS input levels.

Easy memory expansion is provided by using Chip Enable and Output Enable inputs,  $\overline{CE}$  and  $\overline{OE}$ . The active LOW Write Enable ( $\overline{WE}$ ) controls both writing and reading of the memory. A data byte allows Upper Byte ( $\overline{UB}$ ) and Lower Byte ( $\overline{LB}$ ) access.

The device is packaged in the JEDEC standard 44-pin TSOP Type II and 48-pin Mini BGA (9mm x 11mm).

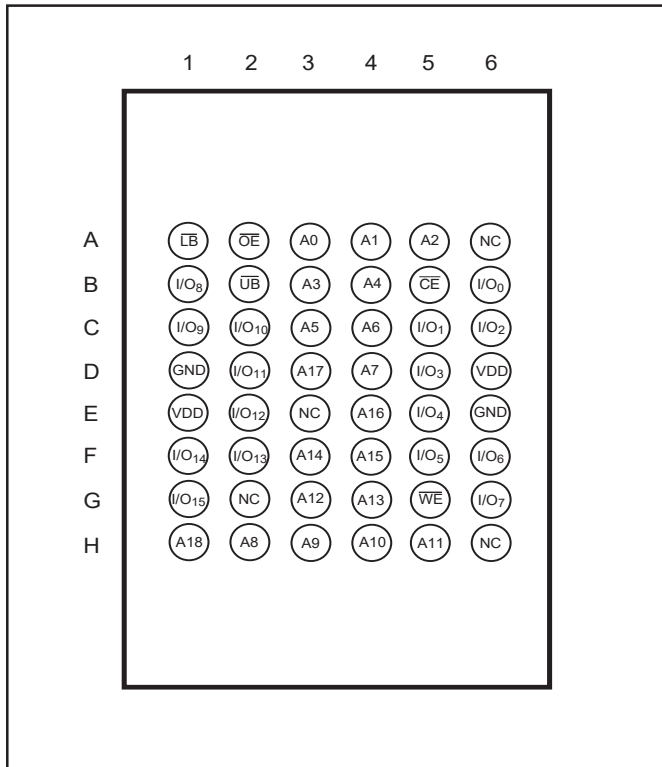
## FUNCTIONAL BLOCK DIAGRAM



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**IS61WV51216ALL**  
**IS61WV51216BLL**  
**IS64WV51216BLL**

**48-pin mini BGA (9mmx11mm)**

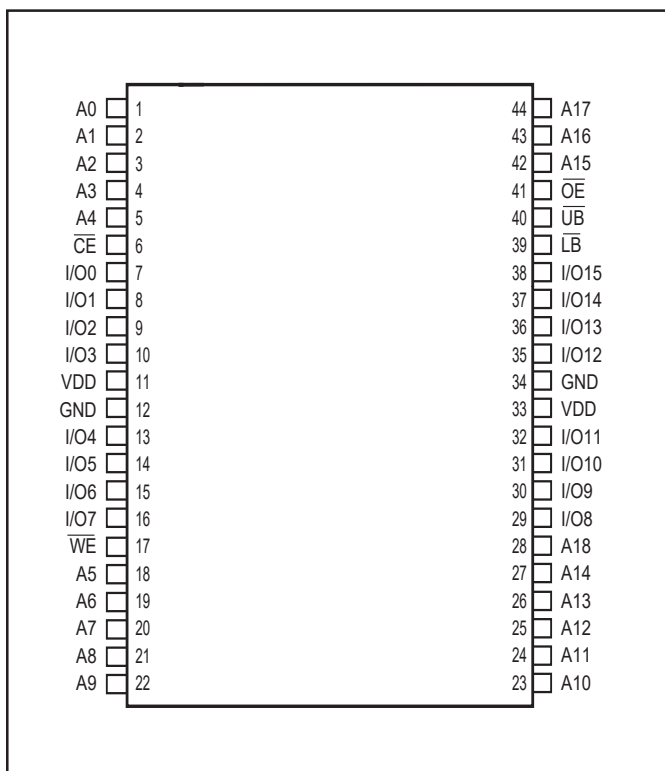


**PIN DESCRIPTIONS**

A0-A18	Address Inputs
I/O0-I/O15	Data Inputs/Outputs
$\overline{CE}$	Chip Enable Input
$\overline{OE}$	Output Enable Input
$\overline{WE}$	Write Enable Input
$\overline{LB}$	Lower-byte Control (I/O0-I/O7)
$\overline{UB}$	Upper-byte Control (I/O8-I/O15)
NC	No Connection
V <sub>DD</sub>	Power
GND	Ground

## PIN CONFIGURATIONS

### 44-Pin TSOP (Type II)



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**IS61WV51216ALL**  
**IS61WV51216BLL**  
**IS64WV51216BLL**

**TRUTH TABLE**

Mode	$\overline{WE}$	$\overline{CE}$	$\overline{OE}$	$\overline{LB}$	$\overline{UB}$	I/O PIN		V <sub>DD</sub> Current
						I/O0-I/O7	I/O8-I/O15	
Not Selected	X	H	X	X	X	High-Z	High-Z	I <sub>SB1</sub> , I <sub>SB2</sub>
Output Disabled	H	L	H	X	X	High-Z	High-Z	I <sub>CC</sub>
	X	L	X	H	H	High-Z	High-Z	
Read	H	L	L	L	H	D <sub>OUT</sub>	High-Z	I <sub>CC</sub>
	H	L	L	H	L	High-Z	D <sub>OUT</sub>	
	H	L	L	L	L	D <sub>OUT</sub>	D <sub>OUT</sub>	
Write	L	L	X	L	H	D <sub>IN</sub>	High-Z	I <sub>CC</sub>
	L	L	X	H	L	High-Z	D <sub>IN</sub>	
	L	L	X	L	L	D <sub>IN</sub>	D <sub>IN</sub>	

**ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>**

Symbol	Parameter	Value	Unit
V <sub>TERM</sub>	Terminal Voltage with Respect to GND	-0.5 to V <sub>DD</sub> + 0.5	V
V <sub>DD</sub>	V <sub>DD</sub> Relates to GND	-0.3 to 4.0	V
T <sub>STG</sub>	Storage Temperature	-65 to +150	°C
P <sub>T</sub>	Power Dissipation	1.0	W

**Notes:**

1. Stress greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

**CAPACITANCE<sup>(1,2)</sup>**

Symbol	Parameter	Conditions	Max.	Unit
C <sub>IN</sub>	Input Capacitance	V <sub>IN</sub> = 0V	6	pF
C <sub>I/O</sub>	Input/Output Capacitance	V <sub>OUT</sub> = 0V	8	pF

**Notes:**

1. Tested initially and after any design or process changes that may affect these parameters.
2. Test conditions: T<sub>A</sub> = 25°C, f = 1 MHz, V<sub>DD</sub> = 3.3V.

**IS61WV51216ALL**  
**IS61WV51216BLL**  
**IS64WV51216BLL**

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**OPERATING RANGE (V<sub>DD</sub>) (IS61WV51216ALL)**

Range	Ambient Temperature	V <sub>DD</sub> (20 ns)
Commercial	0°C to +70°C	1.65V-2.2V
Industrial	-40°C to +85°C	1.65V-2.2V
Automotive	-40°C to +125°C	1.65V-2.2V

**OPERATING RANGE (V<sub>DD</sub>) (IS61WV51216BLL)<sup>(1)</sup>**

Range	Ambient Temperature	V <sub>DD</sub> (8 ns)	V <sub>DD</sub> (10 ns)
Commercial	0°C to +70°C	3.3V ± 5%	2.4V-3.6V
Industrial	-40°C to +85°C	3.3V ± 5%	2.4V-3.6V

**Note:**

1. When operated in the range of 2.4V-3.6V, the device meets 10ns. When operated in the range of 3.3V ± 5%, the device meets 8ns.

**OPERATING RANGE (V<sub>DD</sub>) (IS64WV51216BLL)**

Range	Ambient Temperature	V <sub>DD</sub> (10 ns)
Automotive	-40°C to +125°C	2.4V-3.6V

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